SECTION 400514

PIPING SPECIALITIES

PART 1 - GENERAL

101. EXTENT

101.1 This Section prescribes the CONTRACTOR'S minimum requirements for piping specialties and shall include air vents for liquid systems, compressed air drain traps, temporary and permanent strainers (including self-cleaning strainers) and restriction orifices for use in electric power generating stations. The CONTRACTOR shall conform to the requirements of this Section as required for the Work and to the requirements indicated on the design drawings.

101.2 This Section supplements the specialty data sheets, piping specialty list, piping line list, piping design tables and valve design tables on which the specialty requirements will be specified in one or more of the attachments.

102. SYSTEM DESCRIPTION OR DESIGN REQUIREMENTS

102.1 Design Requirements:

a. Specialties shall be designed to function to the appropriate ASME, NFPA and AWWA Standards as specified herein.

b. All specialties and operators shall be suitable for indoor or outdoor installation, based on prevailing ambient conditions at their installed location.

c. The pressure-temperature ratings shall be those specified in the applicable ASME standard for the type of end connections used.

d. For specialties which must be installed with flow in a particular direction or with a particular orientation, the flow direction and/or orientation shall be clearly and indelibly marked.

103. REFERENCE DOCUMENTS

103.1 Standards, specifications, manuals, codes and other publications of nationally recognized organizations and associations are referenced herein. Methods, equipment and materials specified herein shall comply with the specified and applicable portions of the referenced documents indicated in Section 014219, in addition to federal, state or local codes having jurisdiction. References to these documents are to the latest issue date of each document, unless otherwise indicated, together with the applicable additions, addenda, amendments, supplements, thereto, in effect as of the date indicated in Section 014219.

103.2 ASME – American Society of Mechanical Engineers:

a. B 31.1 – Power Piping Code

b. Boiler and Pressure Vessel Code, Section VIII – Division I Pressure Vessels

c. Boiler and Pressure Vessel Code, Section XI –Welding and Brazing Qualifications

103.3 ASTM – ASTM International:

a. A 106 – Specification for Seamless Carbon Steel Pipe for High Temperature Service

b. A 167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

c. A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

d. A 515 – Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service

e. A 672 – Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures

103.4 AWWA – American Water Works Association

103.5 EJMA – Expansion Joint Manufacturer's Association

103.6 ISO – International Organization for Standardization

103.7 MSS – Manufacturers Standardization from Society of the Valves and Fitting Industry Inc.:

a. SP – 25 – Standard Marking System for Valves, Fittings, Flanges, and Unions

103.8 NFPA – National Fire Protection Association

103.9 All other codes and standards issued by the organizations listed in the specification and as further listed herein.

104. GENERAL QUALITY CONTROL AND QUALITY ASSURANCE PROVISIONS

104.1 Piping specialties provided by the CONTRACTOR shall conform to the requirements of the governing Code(s); in other respects, piping specialties shall conform to the requirements of this Section and shall satisfy all conditions and requirements specified.

104.2 ASME Code vessels, pipe, valves and other ASME components furnished by the CONTRACTOR shall be marked and stamped in accordance with the applicable requirements of the ASME Code designated in this Section.

104.3 Certification and Data Reports for all piping, vessels and components furnished by CONTRACTOR shall be submitted in accordance with the requirements of the applicable section of the above codes and (where applicable) standards.

104.4 Each ASME Code vessel furnished by the CONTRACTOR shall be assigned a National Board Number which shall be indicated on the Manufacture's Data Report.

104.5 All welding shall be performed by operators and procedures that are qualified in accordance with the ASME Boiler and Pressure Vessel Code, Section IX, Welding Qualifications.

PART 2 - PRODUCTS

201. COMPONENTS

201.1 Strainers:

a. Strainers shall be designed so as to be completely drainable. Temporary cone strainers installed at the suction of a pump are exempt from this requirement.

b. Strainer mesh or baskets shall be accessible for removal and cleaning without removing the strainer from the pipeline. Temporary cone strainers are exempt from this requirement.

c. All except Y-type strainer inlet and outlet connections shall be drilled and tapped to accept CONTRACTOR's pressure instrumentation.

d. Strainer mesh or baskets shall be capable of taking the full line operating pressure across a fully blocked strainer without damage, and shall be suitably reinforced as required to accommodate this feature.

e. Each manual strainer with a heavy cover plate and large basket(s) shall be provided with a lifting device mounted on the strainer body to facilitate removal of cover and basket(s) by a single person performing manual cleaning.

f. All straining elements shall be constructed of ASTM A240 Type 316 stainless steel. Alternate material shall be used if stainless steel is not compatible with the fluid.

g. Plate or flat type strainers inserted between flange faces shall not be acceptable since the area open to flow is less than the pump suction pipe inside area. Conical strainers which may be inserted in a flanged spool piece in the pump suction close to the pump suction flange are acceptable for temporary use at startup. Tee type strainers with sufficient flow area may also be used.

h. Bodies on basket strainers shall have bolted top covers, unless otherwise specified. Strainer bodies shall have tapped and plugged drain connections.

i. Each self-cleaning strainer shall be motorized, automatic with flanged end connections and with the body and cover designed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code. Inspection openings shall be provided to permit visual inspection or changing of straining media without removing drum.

j. Each self-cleaning strainer shall be equipped with a controlled, automatic strainer backwashing system capable of providing continuous or intermittent backwashing operations while maintaining the specified output flow. A motor or pneumatic cylinder operated backwash valve shall be provided. Pneumatic valves shall be supplied with a solenoid air valve and an air pressure filter-regulator set mounted in the actuator.

k. No initial pipeline flushing should be permitted through the pump. Initial pump operation after line flushing shall be with temporary strainers in place and the strainers shall remain in place until full pump flow at full temperature has been reached and inspection has established that no debris is being collected.

201.2 Restriction Orifices:

a. Orifice plates shall be circular concentric paddle type with square edge inlet. Orifice plate and paddle shall be either formed from a single solid plate or properly welded together. Minimum plate thickness shall be ¼ inches.

b. Each orifice plate for mounting between flanges shall be provided with a handle on which the orifice diameter and pipe diameter are stamped on the upstream side of the handle. This information shall be located where it can be read without removing the orifice plate from the pipeline.

201.3 Flexible Hoses:

a. Flexible hoses indicated for water service shall be stainless steel braided metal hoses or acceptable equal.

b. All hoses 2 inches and smaller shall have screwed end connections and all hoses 2½ inches and larger shall have ASME Class 150 flanged end connections and shall be designed for the pressure and temperature specified in the Pipeline List.

c. Flexible metal hose shall be of corrugated construction of stainless steel and shall have braided coverings. Fittings shall be attached to the hose with brazed joints.

201.4 Pipe Expansion Joints (Metal):

a. Design Requirements:

a1. Each expansion joint element shall be of the packless bellows type, hydraulically rolled or die-formed from a stainless steel cylinder. The stainless steel cylinder shall preferably be seamless, but in any case shall have no more than a single longitudinal weld in sizes under 16 inches in diameter and no more than two longitudinal welds in sizes 16 inches in diameter and larger. The longitudinal weld bead(s) shall have essentially the same thickness as the parent metal. No welds shall be used to form the corrugations. All restraining bolts and nuts shall be stainless steel.

a2. The lateral and rotational movements shall be applied on each side of the joint center line.

a3. The axial, lateral and rotational movements shall be accommodated simultaneously.

a4. Each joint shall be stable against buckling or squirming when subjected to the operating conditions specified or during the specified hydrostatic test.

a5. Universal expansion joint assemblies shall be designed and constructed such that the full weight of the center spool piece and any connected piping shall be carried by the tie rods and not by the joint bellows.

a6. Limit stops and temporary positioning devices, when required, shall be designed so as not to interfere with the installation or removal of the joint from the piping system.

b. Covers:

b1. The flexible portion of all expansion joints shall be provided with a permanent, stainless steel cover over the full circumference to protect it from damage by falling objects, prevent foreign objects from lodging between convolutions and protect convolutions from erosion. These covers should be removable to permit bellows inspection and shall in no way limit the free movement of the flexible portion of the joint.

c. Materials:

c1. Materials for the expansion joints and components shall be in accordance with the following as appropriate for the application:

c1.1 Internal sleeves shall be Type 304 stainless steel per ASTM A167 or ASTM A240.

c1.2 Covers over flexible portion of expansion joints shall be Type 304 stainless steel per ASTM A167 or ASTM A240.

c1.3 The spool pieces and welding stubs shall be made of seamless carbon steel conforming to ASTM A106, Grade B, Schedule extra strong for sizes up to and including 24 inch. All sizes above 24 inch shall be per ASTM A672 for welded plate pipe Grade B-60 (plate materials per ASTM A515, Gr. 60) Class 22, 1/2 inch plate thickness.

c1.4 Expansion joint bellows element shall be Types 304 or 316 stainless steel per ASTM A167 or ASTM A240.

201.5 Pipe Expansion Joints (Rubber):

a. General Design and Construction:

a1. Straight spool type expansion joints shall be concentric and at right angles to the flanged ends.

a2. Expansion joints shall be reinforced as applicable to suit the particular location and service for which they are intended.

a3. Expansion joints shall be designed for the design and hydrotest pressures. Additionally, the expansion joints shall retain full function and not collapse under vacuum conditions.

a4. When specified, the expansion joint shall be furnished with tie rods to restrain pressure thrust forces. The tie rods shall not limit the ability of the expansion joint to satisfy the design movements and shall be adjustable by the DISTRICT during piping system operation. The tie rods shall be equally distributed around the circumference of the expansion joint and shall be sized to restrain the resultant pipeline pressure thrust forces at the specified maximum design pressure. Tie rods shall be furnished complete with all flanges, gaskets, nuts, bolts, and mounting hardware.

a5. Expansion joints located outdoors will be exposed to sunlight and thus subject to ultraviolet light. Materials of construction for expansion joints located outside shall resist softening and deterioration resulting from prolonged exposure to ultraviolet light.

a6. Expansion joints for low temperature water service shall be elastomer or rubber expansion joints reinforced in each case to suit the particular location and service for which they are to be used. Elastomer expansion joints shall not be used in piping where the working temperature exceeds 150°F.

a7. Expansion joints shall be suitable for the working pressures or vacuum, temperatures, and pipe movements in the line where they are to be installed and shall be of design, type, and manufacture acceptable to the CONTRACTOR.

b. Materials:

b1. All materials used in construction of the expansion joints and appurtenances shall be the best suited for the application.

b2. All materials used in the expansion joints, unless otherwise specified, shall be manufacturer's standard suitable for services and operating conditions as specified.

202. SOURCE QUALITY CONTROL

a. Shop Tests:

a1. Equipment shall be given tests to assure that workmanship and materials are free from defects and to establish that the design, construction and performance meet the requirements of this Section.

a2. All equipment shall be hydrostatically tested to the test pressures of the applicable ASME Standard and/or pressure rating class.

203. FABRICATION REQUIREMENTS

203.1 Welding:

a. All welding shall be done in accordance with CONTRACTOR's welding requirements, which shall comply with the applicable codes and standards. No plugging, impregnation, brazing or welding repair shall be permitted on cast iron or ductile iron.

203.2 Identification:

a. All specialties shall have a securely attached metal tag marked to identify each item and its particular service. Tags shall be furnished in accordance with Section 016131, unless otherwise specified.

PART 3 - EXECUTION

Not Used

END OF SECTION 400514